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Rectal Alimentation in the
Nausea of Pregnancy

Intestinal Inhaustion, the Rationale
of its Efficiency

BY

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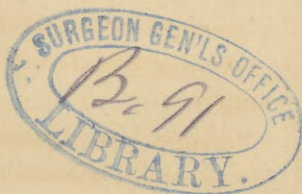
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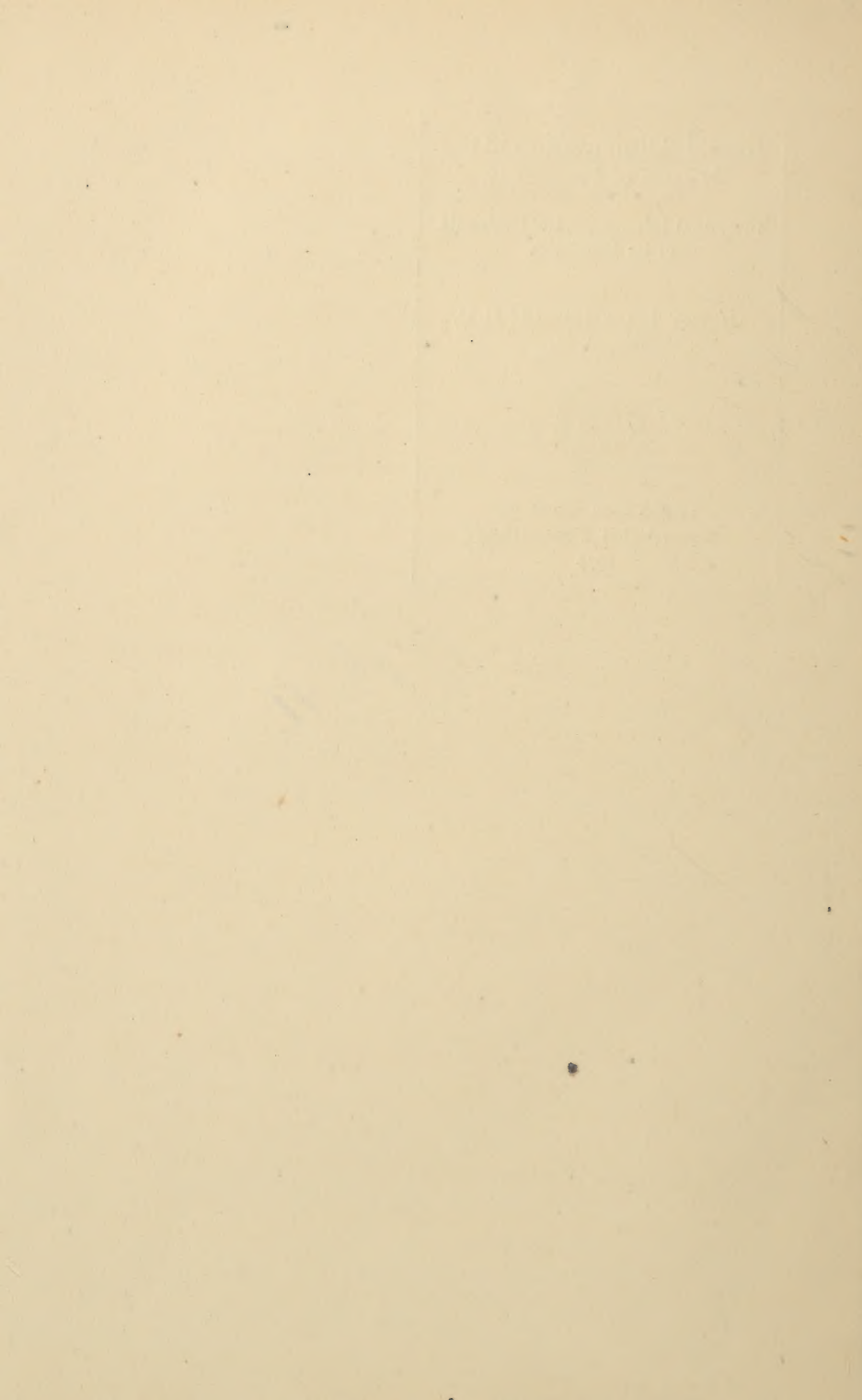


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RECTAL ALIMENTATION IN THE NAUSEA AND
INANITION OF PREGNANCY. INTESTINAL
INHAUSTION, AN IMPORTANT FACTOR
AND THE TRUE SOLUTION OF ITS
EFFICIENCY.

BY HENRY F. CAMPBELL, M. D.,

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THE introduction of nutrient materials by the rectum, in various conditions of obstruction or of other disability in the upper portions of the alimentary canal, has of late been somewhat widely discussed. In the present paper, I propose to consider it briefly in one of its most obvious applications, which, it appears to me, considering the comparatively frequent demand for it, has received but slight attention. Neither in recent disquisitions nor in the references made to it in standard works, do we find more than a secondary importance given to rectal alimentation, as a reliable means of sustaining life in the dangerous condition to which women are brought by the persistent and uncontrollable vomiting of the earlier months of gestation. The condition of the patient, in the severer cases, has ever been regarded as one for grave consideration. We scarcely ever encounter in books, however, any representation which portrays the hopeless suffering of the patient, as it will be found in the recollections of any one who may have had the misfortune to see death by starvation threatening his patient and her unborn offspring, while he, with futile efforts, tries to stay the progress of the hunger and emaciation which seem steadily, day by day and hour by hour, to be taking them to the grave.

I will not delay this meeting with the detail of author-

ities. It is sufficient here to remind the Fellows present, that a state so hopeless is often enough arrived at, from the nausea and inanition of pregnancy, to constitute it, in the minds of a large proportion of our profession, one of the very few conditions which authorize — nay, which make it the imperative duty of the obstetrician to sacrifice the fetus by induced abortion, as the only means of saving the life of the mother.¹

My single purpose now is to present “Rectal Alimentation,” as it has been aptly designated, as finding in the nausea and inanition of pregnancy a fuller and more frequent application than in any of those conditions of stomachic disability so frequently discussed or than has heretofore been distinctly recognized by the profession even when treating of the measure as an expedient of nutrition;² and further, to call attention, by an illustrative case, to the efficiency of the measure, and to the rationale of its success. In the recent discussions of the subject, such as occurred in the New York Academy of Medicine last year, most valuable information in regard to rectal nutrition in its general application was elicited; and in the communication made by Dr. Austin Flint, will be found, perhaps, the largest collection of cases to be seen in any one paper.

¹ “The subject of excessive vomiting in pregnancy, involving the life of the mother, has recently attracted much attention. In 1852 there was a remarkable discussion in the French Academy of Medicine, embracing more particularly the question — Is it ever justifiable to induce abortion in cases of excessive vomiting? The discussion grew out of a report submitted to the Academy by M. Cazeaux, and there was much conflict of opinion on the subject, the ultimate decision being of a mixed character. It is conceded that pregnant women have occasionally died from the effects of vomiting; there are some striking instances recorded, and I am quite sure the unrecorded experience of practitioners could furnish many more examples.” — *Principles and Practice of Obstetrics*, by Gunning S. Bedford, A. M., M. D., New York, 1866, p. 671.

² Dr. Austin Flint, in a most instructive communication on *Rectal Alimentation* (see *American Practitioner*, January, 1878), though presenting a list of the conditions in which it may be applicable, does not once refer to the nausea and inanition of pregnancy.

The perfect efficiency of the method is there shown. Nutrition was maintained in a number of patients, ranging in time from three weeks to five years — the majority of them by rectal diet alone, while in others, buccal ingestion constituted so inconsiderable a part of the supply, as in no way to vitiate the assumption that "life may be sustained indefinitely solely by rectal introduction of aliments." Suggestions as to its applicability to the nausea and persistent vomiting of pregnancy, were incidentally made by distinguished Fellows of the Society.¹

In a hasty review of the subject, I find that many authors who regard excessive nausea and vomiting as very serious, still do not even mention rectal nutriment, while some who do refer to it attach little importance to it. Dr. Davis, of London,² says: "It has been attempted to convey nutriment to patients incapable of receiving any through the stomach, in consequence of its being instantly rejected, by the absorbents of the skin, by means of rubbing milk, etc.; more nutriment, however," he continues, "may be introduced into the system by clysters." Its association here with "rubbing milk into the skin" certainly gives us no very high idea of his estimate of the value of "nutriment by clysters."

Moreau says: "If vomiting be very frequent, it occasions pain and an agitation which, in some instances, may oppose the progress of pregnancy and produce abortion; at other times it interferes with the nutrition of the woman, and gives rise to emaciation and consequent irritability which, in some rare cases, may prove fatal." He gives elaborate directions concerning medication and nutriment, but does not mention the rectal administration of either among his expedients. In his discussion of the severer cases, M. Cazeaux devotes an unusual number of pages to the subject; he dwells at length upon the apparent extreme danger of some cases, suggests every expedient by which stomachic nutrition may be maintained and his especial

¹ Dr. Fordyce Barker and the late Dr. E. R. Peaslee.

² *Obstetric Medicine*, London, 1836, p. 860.

horror, induced abortion,¹ avoided, and yet he does not mention nutrient injections among them. Dr. Hodge² also abounds in remedies and devices to arrest the exhausting and distressing symptoms of this complication of pregnancy, but makes no reference to rectal alimentation. Dr. Elliott,³ however, in the report of a fatal case in which the induction of premature labor was practiced, says: "Supporting treatment" was resorted to by the mouth and rectum; but she steadily lost ground from the date of her admission."

Leishman⁴ expresses himself as follows: "In some cases where the irritability of the stomach seems merely to be increased by food and drink, it will be proper for us to sustain the powers of nature by nutritive enemata;" but he, like Davis, again lessens our idea of his confidence in the measure by adding, "and availing ourselves of the probability of ingestion by the skin, we may give warm baths to which gelatinous matter in any form may be added; or inunction by means of cod liver or other oil may be practised."

Neither time nor the scope of these remarks will allow of further rehearsal of the estimate put by authorities upon this expedient.

I have, for many years, regarded nutrient enemata as a valuable *stand-by* in all cases in which the ability to take food naturally was, from any cause, long delayed, and among these have recommended the measure for short periods, in the severer cases of gravid nausea.⁵ In many of these cases, there was no particular danger of inanition, but the expedient was suggested by me to relieve the stom-

¹ According to his estimate one in seven is the average of escapes from death after the operation. He thinks the most desperate case, as he cites several to show, has a better chance on the expectant plan with such nutriments as can be retained than in the resort to induced abortion. Op. cit., p. 277.

² *Principles and Practice of Obstetrics*, 1866.

³ *Obst. Clinic*, 1868, p. 167.

⁴ *System of Midwifery*, 1875, p. 222.

⁵ The term "gravid nausea" is here adopted for its brevity.

ach, and to supplement, for a while, the deficiency in its supply of nutriment to the system. Among common cases, I can refer to one of paralysis in the muscles of deglutition from diphtheria, where rectal nutrition had to be exclusively relied upon, for many weeks, until the disability subsided; and another of constriction of the fauces from traumatic tetanus, in which, though fatal, the patient himself (the late George M. Newton, Professor of Anatomy in the Medical College of Georgia) proposed the operation of esophagotomy, but was for many days relieved of the pangs of hunger and thirst by the ingestion of beef tea and water by the rectum. Another case, which I have not seen referred to in any recent discussion, is that of Dr. Marshall Hall, of London. Though suffering from an obstructive cancerous affection of the esophagus, he yet, with a noble zeal, continued his labors during many months, in which he was physically sustained almost entirely by nutrient enemata.

In my own experience, as I have just said, rectal alimentation has not been by any means always applied as a *dernier ressort* in hopeless cases, but as an expedient for supplementing inadequate nutrition by the stomach. An injection of beef tea once daily has been in many cases a preventive of that exhaustion and extreme emaciation which I am certain would otherwise have resulted.

But few extreme cases of gravid nausea and vomiting can be expected to occur in the experience of any one physician, and still more rarely does it happen that the opportunity for daily personal observation is afforded throughout the continuance of a case. The following somewhat prolonged case, over six weeks, is the occasion of the present communication, and I shall therefore present in detail the result of my observations — more especially such as relate to the sustenance of the patient by rectal alimentation : —

Gravid Nausea. — Nutrition maintained for Fifty-two Days by Rectal Alimentation alone.

August 24, 1874. Mrs. C. M. H., aged about twenty-nine years, had been for some time irregularly under my treatment. She had expressed apprehensions that conception had occurred. She greatly dreaded the condition on account of the suffering she had endured in a previous pregnancy which had been marked by considerable nausea, but especially did she fear it because her life had been despaired of from anasarca, at about the fifth or sixth month. At the present time she had lost her appetite, vomited nearly everything she ate or drank, and was feeble and emaciated, though she had not as yet confined herself to the house.

On the 28th of August I was called to see her and found that she had eaten nothing for several days, and that her suffering from nausea was very distressing. The pulse was feeble and irritable; though she had taken neither food nor drink, I found her vomiting large quantities of a glairy fluid from the stomach. Owing to her utter incapacity to take food, and her rapid emaciation, I regarded the case with unusual apprehension, and saw at once that I had no ordinary "morning sickness" to deal with, but a case of the most intractable character. Nutritive enemata of ordinary beef tea, with the addition of Borden's condensed beef, were systematically administered from this time.

Her stomach showed such irritability that medicines by the mouth, no less than food, were plainly out of the question. Soda water, champagne, "Potion de Rivière," and oxalate of cerium, had all been tried in vain. I had also applied a blister to the epigastrium without in any degree modifying the symptoms. Morphine and atropia were given subcutaneously to quiet nervousness. Suspecting gravid displacement of the uterus to be the cause, postural pneumatic replacement of a moderate degree of retroversion was readily and repeatedly accomplished, but no relief afforded. Finding that leucorrhea was profuse, I decided on a specular examination, hoping to discover in the condition of the cervix some adequate excitor of the exaggerated hysteroneurosis of the stomach.¹ From some circumstance this lady's husband

¹ "I am persuaded," says Dr. Bennett, "that those gastric disorders and obstinate vomitings which so often bring women to the portals of the tomb, are almost always caused by inflammatory ulcerations of the

and his family had acquired some vague knowledge of induced abortion as a "sure and safe expedient for the relief of the nausea of pregnancy," and before I had myself admitted so despairing an idea, it was urged upon me by them with much persistency. I now requested consultation with Professor Joseph A. Eve, for though she retained all the rectal nutriment, and also water administered two or three times a day in the same way, the nausea was but little abated. Small lumps of ice or teaspoonfuls of water when taken to relieve the unpleasant taste in the mouth, often caused her to vomit half a basinful of the glairy fluid secreted by the stomach, sometimes mixed with bile and often with bluish flocculi. I desired that Dr. Eve should be present at the specular examination, so that in case abortion were determined on — which I did not favor — the process might be begun at that time.

September 20. Examination detected general redness and tumefaction of the vagina and cervix. There was a large collection of leucorrhœal fluid in the speculum. We at once discovered a considerable superficial but well-defined ulceration near the os. The edges of the ulcer were somewhat ragged, and the surface was covered with a whitish curdlike deposit, through which red bleeding granulations could be seen. This erosion encroached somewhat upon the external os, occupying one side of the canal to a slight extent. Dr. Eve and I both abandoned even the slight idea we had entertained of induced abortion, feeling assured that in this angry and irritable erosion we had discovered the cause of the nausea and vomiting as confidently asserted by Dr. Henry Bennett, to be the invariable provocative in nearly all cases.

This surface was freely cauterized with the solid nitrate of silver; but I am sorry to say, with no perceptible immediate effect upon the reflex gastric phenomena.

Besides the repetition of the blister over the epigastrium, the expectant plan, with, if possible, a more regular and systematic application of the rectal nutriment, was the result of our conference. The failure of cauterization and the continuance of the gastric distress, though I felt confident of her pretty satisfactory well-doing upon rectal alimentation alone, caused the family again neck of the womb." "For my own part," he adds, "since my attention has been directed to the subject, I have *almost invariably* found ulceration of the neck in cases of this kind."

to urge the measure of induced abortion. Prof. L. A. Dugas was now added to the consultation.

September 27. The patient had for some few days past vomited less of the fluid secretion — she had not pretended to take either food or drink — and appeared more comfortable. She had always retained the rectal nutriment without difficulty — seldom requiring the addition of any opiate as at first. She was somewhat more cheerful than heretofore, though she could not sit up a moment without retching. On examination with the speculum, the erosion was found in a healing condition, and it was decided not to repeat the application of nitrate of silver. Tepid injections of water were daily applied per vaginam. The measure of induced abortion was fairly considered, but there was no disagreement as to its rejection — especially as we had some reason, though there was neither motion nor fetal heart-sounds perceptible, to believe the fetus to be alive. The very large percentage of fatal results from the measure under the circumstances of our case, was, of course, the more cogent reason, determining us to adhere to the expectant plan, and to depend upon rectal alimentation. We all agreed that the evidences of an adequate nutrition by the rectal introduction of food were amply sufficient to warrant us in relying upon it, to secure her from any danger of fatal inanition.

October 4, 10 A. M. From August 25 to the present time, Mrs. H., though frequently distressed with nausea and unwilling, and, I believe, unable to take the smallest amount of nutriment or drink without provoking immediate vomiting, improved in color, increased apparently in flesh and strength, slept well, being scarcely ever awakened by the gastric disturbance. She was also more cheerful, but said she feared she should always be obliged to take her food in this unnatural way. "She never expected to eat again."

October 4, 4 o'clock, P. M. At this hour Mrs. H. began to complain of lumbar and uterine pain. Being sent for, I found abortion in progress, though at my morning visit there had been no such indication; the os uteri was well dilated; there was no sanguinous flow. A dead fetus of three and one half months was soon easily expelled. The womb apparently contracted well.

Contrary to all our expectations and hopes we found that the nausea was in no degree abated by the evacuation of the uterus. In reflecting upon this case subsequently and from the appear-

ance of the fetus, I have concluded the latter must have been dead for some time previous to expulsion. The continuance of nausea before the abortion was one of our grounds for supposing the fetus to be alive; but all the circumstances, as developed subsequently, rather militate against this supposition.

According to memoranda carefully kept by her husband, Mrs. H. continued to be distressed with nausea and to be nourished solely by the enemata for fourteen days after the expulsion of the fetus, and for a much longer period this had to be continued as supplementary to her very gradually returning power to take and retain food by gastric ingestion.

During this time she improved rapidly in flesh and in color. We at this time added a solution of tartrate of iron and potassa, five grains, quinine, five grains, and sometimes, stimulants to the nutrient injections.

Method of Rectal Alimentation in the above Case.

By reference to the note recording the beginning of rectal nutrition in this case, it will be seen that on the 27th of August, in order to inaugurate properly this method of nutrition, I began by administering the first enema in the presence of the attendant. This consisted of beef tea or beef essence. For gastric ingestion this fluid is skimmed and decanted so as not to offend the taste of the patient by the oil or the sediment, the clear fluid only being given. In my use of it for rectal administration, the settlings and also the oily particles are retained, in order to render the ingestion more nutritious. In addition to the beef essence I added to each injection of eight ounces one teaspoonful of Borden's, or Leibig's, or sometimes Valentine's, condensed preparation of meat.

There are various opinions as to the nutrient properties of ordinary beef tea, and therefore the condensed preparation in some one of the above forms was always added to insure a *double chance* that our rectal food should possess adequate nutrient elements. Other articles were at times added, such as rice-water, arrow-root, jelly, gruel, etc., blanc-mange, custard, whipped cream, etc., and used as found convenient, but always with the beef tea strongly made.

On the application of the first injection—an ordinary tumblerful of beef tea—there was some tendency to evacuation, continuing but a short time when the bowel was rendered tolerant by a pressure against the levator ani.

Notes on the Process of Administration.

The mixture above described was that ordinarily used in the case. A large gobletful, — at least half a pint, — perhaps ten ounces, was injected twice daily. The propulsion of the fluid was very slowly and gently made till the vessel was entirely exhausted. By care in excluding the air, there was seldom any danger of losing an enema — large as they were — and I cannot remember a single occasion during the treatment in which an entire injection was lost. In addition to the nutriment thus given the *drink* of the patient was represented in the rectal administration of water with or without the addition of wine or brandy, as appeared suitable to the condition and feelings of the patient. During the interval of the morning and evening injections a full goblet of water, not quite cold, was twice given some hours apart.

In addition to the records above presented such as the generally beneficial effect of the rectal ingestion of food, etc., there are certain observations which I have reserved for separate mention, intending to discuss but one of them at any length.

First. That the rectal aliment seemed always, as has been observed in other reports of cases, to relieve the patient of the feeling of hunger and “sinking” in the epigastrium which often marks prolonged abstinence, and from which she sometimes suffered when the injection was delayed. The injection of the water, often called for by the patient on account of the dryness of the mouth and fauces, — increased, I suppose, by the atropia and morphine, — also relieved her thirst promptly, as well as the dryness in the mouth, for hours at a time.

Secondly. The *alvine discharges* were quite natural — “figured passages” though by no means regular; they

generally occurred once or at most twice during the week. In no instance that they were examined, was there found any trace of the articles used for nourishment. The discharges were, when iron was not used, properly colored with bile, and always solid. The amount of fecal matter passed was much less than the average of health.

Thirdly. The urine, which was not tested, either as to its specific gravity or its constituents, was somewhat less, I should think, than that of health, generally of rather a pale amber color, but sometimes dark and reddish. There was no irritability of the bladder or vesical mucus. The large quantity of fluid sometimes vomited may possibly have caused a diminution in the amount of urine.

Fourthly. Intestinal movements. — For a very large portion of the time during which this patient was under treatment, emaciation was extreme, and the abdominal wall very thin, thus affording the best possible opportunity for observing the effect of the introduction of aliments upon the intestinal canal. On the completion of the injection more or less gurgling within the abdomen, and some obscure movements of the intestines were often perceptible. At first, these were regarded as an indication that the nutritive enema was provoking peristaltic action which might cause it to be expelled. On several occasions, I inquired of the patient if she felt any uneasiness indicating the loss of the injection. Her answer at first surprised but also satisfied me as to the perfect safety of the retention: "No, doctor, that sound and movement always follows the enema — it is sometimes perceived at once and sometimes later, but I always feel easier after that rumbling takes place. I think it is the beef-tea going up into my bowels, for, after that, I never feel any disposition to pass it off." Daily personal observation fully convinced me of the fact that the movement was an upward one. It continued sometimes for more than an hour in a less obvious manner, as was noted by the patient and an intelligent relative in constant attendance. "Upon this hint I speak," for upon this observation and the interpretation I hope legitimately to give it, mostly de-

pende the principal value of the case, in the discussion of the rationale of rectal alimentation. I shall refer again to it as the evidence of reverse peristalsis, or, as I would prefer, retro-stalsis, which, as will be seen hereafter, I can but regard as a most important though heretofore unrecognized factor in the efficiency of all the devices for rectal feeding.

MR. PRESIDENT, — It has been neither for the purpose of reporting a case of but moderately prolonged sustenance by rectal nutrition, that I have presented this paper to the Society ; nor as a mere novelty have I detailed the phenomena as observed by me for over seven weeks. There are on record, as we have seen, many cases affording equal, and some of them much more striking proofs of the adequacy of rectal alimentation to sustain life over protracted periods of time, — three months, twelve months, three years, and even five years,¹ have passed during which persons have been nourished by food introduced solely from this direction. These were cases in which, as in my own, there was no other possible avenue by which pabulum could find access to the blood. My object has been far different, and my endeavor more comprehensive. I have desired to present certain relations in which, in this case, I have been afforded the opportunity of studying phenomena that might transpire unobserved and uninterpreted during years of successful rectal feeding. I desire to awaken the interest of others — to elicit impartial discussion upon the obscure and heretofore little explored field of research that pertains to the physiology or rationale of rectal nutrition.

The little importance attached to this method of ingestion, until a very recent date, has, I think, been principally due to two prominent causes or rather *methods of reasoning* upon the subject: —

First. As the rectum and even the colon are comparatively devoid of lacteal vessels, much incredulity exists as

¹ Most of these will be found referred to in the discussion before the New York Academy of Medicine, and given more fully, perhaps, in Dr. Flint's paper, "Cases Illustrative of Rectal Alimentation, with Remarks," in the *American Practitioner* for January, 1878.

to their power of absorbing and carrying to the blood aliment in any degree adequate to the sustenance of life.

Secondly. Even were the rectum abundantly possessed of lacteals, and endowed with the most active powers of lacteal as well as of venous absorption, neither of these modes of ingress could be utilized, on account of that thorough disintegration and solution, so indispensable to nutrient absorption and assimilation, being entirely deficient, in the absence of those chemico-vital "*digestive fluids*;" the gastric juice, the bile, the pancreatic juice, and, perhaps, the secretions of the small intestine, so necessary to the solution, attenuation, and proper elaboration of, alimentary matters preparatory to their absorption into, and admixture with the blood.

I have thus enumerated but two of the more common and obvious objections that have been made (though I do not know that they have been anywhere formulated), to rectal assimilation and absorption. I fear, however, a more extended examination of the intimate structure of the lacteal absorbent apparatus, — of the essentials to, and modus of, lacteal and venous absorption as they are effected in the villi, showing each one to be a highly organized and elaborately constructed absorbent gland, so to speak, with a portal radicle and lacteal ramus in its centre; these also thickly studding the mucous membrane down to the ileo-cecal valve, where they abruptly disappear; and finally, the extent of this mucous membrane greatly increased by valvulæ conniventes to retard the progress of the chyle, and to offer surface and facility for the double absorption of the prepared fluid. I repeat, I fear that such a study would rather increase than relieve the difficulties of faith in regard to rectal assimilation and absorption. Such considerations would be calculated to cause the direct entry from the rectum into the blood, of composite and unelaborated aliments, to be regarded by many as a physical impossibility and a physiological absurdity. This is the apparatus, however, and such as briefly sketched are the conditions upon which intestinal di-

gestion and absorption depend.¹ Now, in nearly all of these requirements the large intestine is totally deficient, though it has a most abundant supply of portal radicles. By these, water and thin solutions of nutriment are most undoubtedly absorbed and carried into the portal circulation for hepatic digestion and for distribution thence to the system.² "So long ago as 1824," says Murchison, "it was shown by Majendie and Tiedemann that the absorption of nutritive matters from the bowels was not limited to the lacteals, but that part was taken up into the blood by the portal vein,"³ etc.

Then, notwithstanding the simplicity of its structure as compared with that of the mucous membrane of the small intestine, there can be little doubt of the capacity of the rectum to absorb a considerable variety of substances; as medicines and also aliments—and to furnish, it may be, a moderate supply to support nutrition through vascular and membranous absorption. A method of food-ingress by which the entire vegetable kingdom and the invertebrate department of the animal kingdom⁴ are supplied from the

¹ F. W. Pavy: *Treatise on the Functions of Digestion; its Disorders and their Treatment*, p. 170. From Second London Edition. Philadelphia, 1869.

² In some experiments on a case of large artificial anus, by Dr. William Hunt, it was found that bits of meat placed in the colon or cecum had no digestive effect produced upon them. Medicines placed in the cecum and colon were inert. It was concluded that neither the cecum nor colon had any digestive power whatever. — *Pennsylvania Hospital Reports*, vol. ii., 1868.

In a paper by Prof. Joseph Jones, of New Orleans, published by the Smithsonian Institution, that distinguished physiologist gave his experiments on various animals to determine the influence of starvation upon sanguification. In the American "gopher," large masses of grass and other crude nutritious matters, in the colon of this chelonian, seemed to keep up nutrition and sanguification, the colonic deposit serving as a *store* of nutrition to prevent emaciation.

³ Op. cit., p. 8.

⁴ "The proper absorbent system is exhibited in its most simple and diffuse form in *Fishes*, the lowest class in which its existence has been demonstrated." — *Principles of General and Comparative Physiology*, by W. B. Carpenter, p. 661.

external world, must, with logical certainty—as it has been by experiment demonstrated—be retained by man and the higher vertebrata notwithstanding their additional endowment with lacteals and an elaborate special apparatus for the absorption of external aliments. I think we may believe, then, that a very considerable portion of the aliments entering the system from food placed in the rectum is quite often taken in by venous absorption through the portal radicles, whence it is carried to the liver for digestion,¹ blood-mixture, and blood-making. But that this is the *only* avenue or that it is through this channel of the rectal blood-vessels that the most abundant supply of rectal pabulum is carried to the blood, I think may be denied with the most positive confidence, and its converse established by irrefutable demonstration as it will in time be by actual experiment.

INTESTINAL INHAUSTION.

There is, in my opinion, as I have already intimated, another which is by far the most important method by which the solution, elaboration, assimilation, absorption, and final introduction of rectal food into the blood is vastly promoted. It is the one first suggested to me by the observation and study of the case the report of which I have made to-day; but the force of the conviction, at that time impressed, has been strengthened by reflection, and more especially by innumerable observations of daily experience which have borne directly upon it. This valuable adjunct and promoter of rectal alimentation, the existence and value of which I hope plainly to show, depends upon what has been variously termed by different writers “reversed peristaltic action”—“inverted peristalsis”—and by Copeland and Pavy, and perhaps many others, “anti-peristaltic action” of the muscular coat of the intestine. I prefer to change these terms to one more directly indicating the re-

¹ Dr. Murchison in his Croonian Lectures says, that “in the first half of the seventeenth century the liver was the centre of sanguification,” and he strongly advocates its reinstatement to that position, now that the modern advances in physiology confirm that view.

sult, more significant of the part it plays as auxiliary to rectal feeding — I shall define this well-known action as "*Retro-stalsis*." ¹ I hope to show that by it the nutrient materials injected into the bowels are, in a shorter or longer time, carried up out of the rectum, and made to reach the portions of the digestive canal, where all the conditions of normal intestinal digestion may be fully met, and where, on account of it, the process can be as effectually accomplished as though the aliment had arrived there by buccal instead of by rectal ingestion. This process, or function, or vital action of coördinated and continuous retro-stalsis is to the rectum and small intestines what deglutition is to the esophagus and stomach. For the want of a more appropriate designation, I propose that it shall be called "*INTES-TINAL INHAUSTION*."

No physiologist of the present day, however fully impressed with the wonderful capabilities of venous and membranous absorption, can feel perfectly satisfied that these alone and without the intervention of some other factor, wanting in the rectum, can rationally and adequately account for the success and apparent perfect efficiency of rectal alimentation as reported in journals — and here and there in some works on practice.² Especially is our ingenuity taxed in the presence of such cases as those discussed before the New York Academy of Medicine, and in the recent collection by Dr. Flint.³ If absorption could account for the disappearance of the injected pabulum from the rectum, and the sustained nutrition of the patient, how are those indispensable pre-requisites to the introduction of food into the blood, viz., digestion, solution, homo-genification, peptonification, to be accounted for, in a cavity devoid

¹ From *retro*, "backward," and *στέλλω*, "I send." "*Prostalsis*," from *πρό*, 'forward' and *στέλλω*, 'I send,' is also proposed as another term briefly indicating the *direction* of intestinal action.

² Leube denies the possibility of rectal nutrition unless the food has been first artificially digested. Pancreatic Emulsion, prepared by him for the use of disabled stomachs, has been used by Flint and others as rectal food. — *Ziemssen's Cyclop.*, vol. vii.

³ Loc. cit.

of every one of the digestive principles requisite to accomplish these acts, and also unprovided with the secretory apparatus by which only they could be supplied? In a question of such perplexity, as it is both interesting and instructive, I will quote, without much comment, the language of Dr. Flint (who of course recognizes no digestion as taking place, *per se*, in the large intestine) in dealing with this dilemma:—

“With reference to this inquiry (about articles of rectal diet) I cannot pass by the physiological question, how is digestion in the large intestine effected? From its failure to procure from the mucous membrane of the colon and rectum a digestive juice, and from experiments on lower animals, physiologists have been led to doubt the ability of these portions of the alimentary canal to perform the function of digestion. Yet secreting glands analogous to those of Lieberkühn are found in considerable numbers in the large intestine and it is not difficult to understand, that they may take on a vicarious activity when the glands of the stomach and small intestine are not excited by the presence of ingesta. This supposition is not inconsistent with the absence of digestive juice in the large intestine when digestion in the stomach and small intestine is not interrupted.”

So indispensable does the admixture and modifying influence of the digestive fluids of the small intestine very properly appear to Dr. Flint,¹ that in addition to the ingenious though scarcely admissible suggestion of their supply by vicarious secretion in certain minute glands of the large intestine, he advances still another possible method by which the digestive chemistry (which by these fluids can alone be effected) is to be secured to the alimentary mass to be assimilated in the large intestine. He thus clearly

¹ A Fellow of this Society—Dr. J. R. Chadwick, of Boston—proposes, in desperate cases, to inject with the aspirator through the abdominal walls nutrient fluids and stimulants into the small intestine, “that part of the alimentary canal from which they will be most readily absorbed.”—*Am. Jour. Obst.*, viii., 399, November, 1875.

enunciates his second proposition : "Another supposition which I will venture to make is, that food introduced into the rectum excites secretion by the gastric and intestinal glands, and, in the absence of ingesta in the stomach and small intestine, the fluids secreted by these glands pass into the large intestine in sufficient quantity to effect digestion within the latter."

I have already defined the method by which I account for the digestion, absorption, and assimilation of food when placed in the rectum. It is this,—differing from all others with which I am acquainted,—that digestion in either rectum or colon is not at all contemplated. Neither by direct absorption on the part of the walls and vessels of these cavities, nor by the means of artificial digestive principles added to the food after the manner of Leube, nor by the glands of the large intestine vicariously secreting the digestive fluids of the small intestine, nor lastly by the alimentary mass in the large intestine exciting the secretions of the stomach and small intestine, and then attracting or in some way acquiring them in order that rectal digestion may take place. My proposition is distinctly the reverse of this last, and asserts that instead of the digestive principles descending to the food to digest it, the food ascends to these fluids in the small intestine, and that it is there digested and prepared for absorption by the proper organs in precisely the same manner as after buccal ingestion.

Facts of Observation.

In substantiation of the important proposition thus enunciated, there are many facts both of observation and experience which will give support to my belief. Let us examine some of these facts.

1st. By the investigations of the majority of physiologists (see Flint's "Text-book of Physiology" and others) the rectum is not a receptacle for the fecal mass, but an avenue of transmission. It is intolerant of the presence of feces, expelling them downward naturally when convenient, but contracting, and returning them into the colon if their

exit is prevented. Gynecologists, by their daily examinations in the vagina, are familiar with the fact that the rectums, even of women of torpid habits, are comparatively seldom found loaded with feces, but empty, and flattened between the vagina and sacrum.

2d. Feces descend and reascend easily from the rectum to above the sigmoid flexure of the colon. In persons of regular habits the desire for defecation indicates the presence of feces in the rectum. If the opportunity is lost they reascend to the colon, remaining perhaps for many hours or even a day before descending to the rectum to provoke again the desire for evacuation. Unquestionably, food, such as beef-tea, injected into the rectum, even by the shortest pipe of a syringe that can be used, must soon disappear like the feces by ascent above the sigmoid flexure of the colon. "I will give one caution," says Allingham,—"Diseases of the Rectum," 1873—"If you wish to let the bougie remain in the rectum all night, take care to secure it by a tape. I have seen a short bougie pass up into the bowel above the stricture out of reach, and considerable difficulty was experienced in removing it."

3d. Injections of a quart or more (as are often given) certainly more than fill the rectum, and, therefore, must ascend by the muscular contractility of the rectum quite easily into the colon, thus showing that food can be propelled upward in the same manner; we can seldom recover more than a small part of any injection (even one far short of distending the rectum), from the fact that it passes upward into the colon. Large injections often excite the passage of feces, and yet the fluid used remains, none at all passing away.

4th. In an extreme case of non-gravid nausea, under the care of Dr. J. B. Ficklen, of Washington, Ga., I found it impossible to prevail upon the patient to continue nutritious enemata. She complained that in vomiting she invariably tasted the beef-tea, that had been injected, in the matters discharged from the stomach.

Mrs. S. W., aged about 40 years, under the care of Dr. I. L. Harris, of Milledgeville, Ga., was the subject of a large ovarian tumor. Ovariectomy was performed by the late Dr. W. L. Atlee, of Philadelphia. Excessive vomiting succeeded. Rectal alimentation was diligently attempted. "None of the beef-tea escaped per anum, but it was constantly, for several days, vomited from the mouth. The vomiting of the nourishment was preceded by stercoraceous vomiting, but afterwards the beef-tea came up almost clear and entirely *unmistakable*, as satisfactorily proved by chemical tests." Dr. Atlee, in his reply to the letter of Dr. Harris, reporting this feature of the case, wrote that he had observed a similar occurrence "from inverted peristaltic action," in one or more of his former ovariectomies.

5th. It is known that fluids have been forcibly injected through the colon "and even made to gravitate slowly through the ileo-cecal valve along the whole track of the small intestine into and through the stomach, and even out of the mouth. . . . The feasibility of this was long ago," says the recent author just quoted,¹ "demonstrated by the illustrious Haller," — "*Primæ Linæ Physiologiæ*," 1767. We are aware that a distinguished Fellow of this Society, Dr. Robert Battey, of Georgia, has accomplished the same feat, but cannot now lay hands upon his valuable paper.

Some of the above instances will show that under efforts made by mechanical means forcibly applied in all instances the way is clear for the gradual passage upward, — less naturally, and with less facility than downward, of course, — for the ascent of liquids from the rectum and large intestine even to the upper termination of the alimentary tract. Of course, in the propulsion onward and upward of the fluid in these cases, reverse or retro-staltic action, and not in all of them the first mechanical force of the instrument used, will be recognized as an agent in the progression of the fluid.

But as I am discussing retro-stalsis as a dynamic act in its agency in the upward movement of the injected food, upon which movement I have claimed that its digestion and

¹ *Essay on Rectal Medication*, by W. Bodenhamer, New York, 1878.

absorption depends, and, therefore, upon it also the success of rectal alimentation, I will briefly refer to a few more facts of common observation sufficiently analogous in character to show the possibility of intestinal inhaustion. There is no section of the alimentary tract which may not be shown in certain conditions, and under certain influences, to perform retro-staltic acts capable of propelling upwards its contents.

1st. "Gagging" is an action of the faucial muscles which reverses that part of the act of deglutition in which they are concerned.

2d. Vomiting, regurgitation, rumination (Copeland — Pavy), and several acts of this class concern both the esophagus and the stomach. The contents, both solid and fluid, ascend, being forced up into the mouth and out of it.

3d. The familiar phenomenon of the ascent of bile into the stomach indicates inhaustion between these two portions of the alimentary canal.

4th. Chylous vomiting (Pavy) is inhaustion from the small intestine, the result of a reversal of peristalsis.

5th. The stercoraceous vomiting in ileus and in strangulated hernia, and in a few other conditions of serious intestinal disturbance, in which the matters are fluid, semi-fluid, and solid, tells its own history, and we know the journey it has taken, and that it must have passed through the ileo-cecal valve.¹ Here is intestinal inhaustion, the very inhaustion we claim as the indispensable factor in all effectual rectal alimentation. It must invariably occur when rectal nutrition is accomplished. The remaining portions of the canal have already been referred to:—

6th. The ascent of the feces under restraint of the sphincter ani, in which the solid mass, as before stated, as-

¹ I am aware that Bointon (see Pavy) has denied that there is any such thing as a reversal of peristaltic action. He describes a downward current that always exists, and that is never reversed, while the phenomena of stercoraceous vomiting depend upon a central current. Well, then, the rectal food ascends by way of this "central current."

cends above the sigmoid flexure ; the ascent of enemata filling the colon when injected only within the sphincter.

We have seen then that every section of the intestinal canal is at times subject, under circumstances generally of irritation or disturbance of various kinds, to inhaust or receive from below the contents of the section continuous with it. That which is so familiarly and demonstrably true as pertaining to one and all of the parts of this alimentary canal may certainly, under similar circumstances, be predicated as pertaining to the whole. Then this upward movement continuously maintained from the rectum to the small intestine, is what I would designate as the intestinal inhaustion subservient to rectal alimentation.

Experimental Research.

Although, in the foregoing enumeration of observed phenomena, a logical demonstration of the existence of intestinal inhaustion, convincing to most minds, may have been arrived at, I have yet sought to give to it the confirmation of actual experiment. Experiments in rectal feeding on the lower animals have been made, I think, by Leube, and perhaps others, but simply to test its efficacy, and also the nutritive power of certain rectal aliments. My present effort had no such object in view. It was made solely to establish the fact of the upward progression of injected aliments, from the rectum to the small intestines, by retrostaltic action. By the suggestion of intestinal inhaustion and its experimental demonstration, I hoped to "cut the Gordian knot" of rectal alimentation.

Some carnivorous animal, as the dog, with a short alimentary canal, would certainly have been more suitable as a subject for an experiment in intestinal inhaustion. I could not, it appears to me, have made a more unfortunate selection than that of a ruminant.

Rectal Feeding of a Kid for Eighteen Days with Colored Aliment.

September 2, 1878, 2 o'clock, P. M. — Subject, a suckling kid, six weeks or two months old. Injection after twenty-four hours' privation of food. Instrument, a piece of No. 8 gum elastic catheter, five inches in length, attached to an India-rubber bulb of Mattson's syringe. I injected three ounces of rich milk, deeply colored with a decoction of madder and solution of cochineal. Result: nearly all of the milk was immediately expelled, together with a large dejection of the fecal scybalæ peculiar to the defecations of the sheep, goat, and some other animals.

Nine o'clock, P. M. — The injection was repeated after the same manner, and retained.

September 3, 10 o'clock, A. M. — I injected three ounces of colored milk. Defecation immediately; nearly all of the fluid lost. Injection of two ounces was repeated in thirty minutes, and retained.

Three o'clock, P. M. — Injection of two ounces of colored milk; no defecation; enema retained.

Ten o'clock, P. M. — Injection repeated, — two ounces; retained.

A detail of the processes and occurrences of our prolonged experiment would be but tedious and without interest. The process, as detailed for the first two days, was continued for eighteen days, till the 20th of September, when the kid was killed by prussic acid dropped upon the tongue. The intervals of administration of the colored fluid were from three to five hours. The defecations became less and less frequent, and when a single bulbful was injected the fluid was generally retained. A small amount of corn-meal was mixed with the milk for the last five days. The kid was also given, two or three times during the experiment, a small handful of apple peelings and some bread, to lessen hunger. The experiment was not intended, or conducted in a manner, to test the efficiency of rectal feeding to support the kid's nutrition. It retained its activity and strength, however, in a surprising degree. As to the effect of the injections in relieving hunger or thirst, it was difficult to decide. The animal certainly made less noise by its bleating for some time after receiving the injection.

No observations were made in regard to the urine. The bladder was collapsed at the time of the autopsy.

The feces were somewhat carefully observed. At first the scybalæ passed at the time of giving the injections were found to be reddened on the surface, from being bathed in the milk and gruel; but on being broken they were of a dark color interiorly. Later in the course of the investigation, the balls became lighter in color, and when broken were found to be colored throughout by the cochineal. Those found in the intestine at the post mortem were all of this character — colored.

Autopsy. — In this examination I was kindly assisted by Dr. John S. Coleman and Dr. A. Sibley Campbell.

September 20, 1868, 5 o'clock, P. M. — The injections had been applied from 7 A. M. to 3 P. M. four times, to insure the presence of the fluid in the intestine.

Emaciation not extreme, but no subcutaneous fat, — no fat about the viscera. The intestines and gastric cavities were somewhat distended with inodorous gas. The very long intestine was carefully examined at intervals, from the anal termination to the last stomach.

On opening the abdomen, and previous to slitting open the intestinal wall, dark-red discolorations were seen occupying many inches of the tube, though not continuous throughout. These were found in all parts of the tract from the anus to the maws. On slitting the tube, these parts of the intestine were found to contain the coloring matter of the injected aliment. The fluid was carefully examined, though no test was applied. In none of the physical appearances did there seem to be any occasion for doubt. In addition to the colored fluid, large numbers of the fecal scybalæ or "balls" were scattered throughout the whole length of the tube. The larger proportion of them consisted of matter which was colored by the stain of the cochineal and madder. I have retained the viscera of the kid used in the above experiment, preserved in a solution of chloral. Whether an examination of sections of the intestinal wall and of the mesentery will detect the coloring matter in the lacteals I have as yet had no proper opportunity to determine.

Thus, so far as the above single and somewhat imperfect experiment goes, we may be said to have added actual demonstration to our rational deductions, in regard to the retrostaltic action of the intestinal canal. The analogy between the goat and the human subject is perhaps too re-

mote to found upon it any very important deductions, but I think a deeper study of the subject of intestinal inhausion will develop the fact that retrostalsis is by no means an action of the intestinal canal, which is to be considered *only* in its relations to rectal alimentation. I am most confident in the opinion that "the progression of the chyle," as it was formerly called, is by no means a progression always in one direction, downward, as is the present opinion, by peristalsis, but that there are alternations of prostalsis and retrostalsis, — progression and retrogression, — during which, in ordinary normal intestinal digestion, the alimentary mass or fluid is presented again and again to the villi and lacteals and mucous surfaces for elaboration and absorption. But our consideration of intestinal action now must be limited to the relations of our present discussion.

I have heretofore remarked that "under certain conditions" the above described retro-peristalsis, or inverted vermicular action, in the several portions or in the entire length of the alimentary canal may reverse the direction in which it ordinarily acts — that prostalsis, by which all its contents progress downward, may become retrostalsis, in which by intestinal inhausion, the, as yet, unrecognized function, it will be drunk in from one lower portion of the intestine to an upper, until the mass finally reaches the small intestine. It but remains now, and the investigation is of the utmost importance to us, considering the character of the cases in relation to which I am discussing rectal alimentation, to inquire whether or not the pregnant woman laboring under the uncontrollable nausea and vomiting and impending inanition incident to her state, can be said to present conditions in which intestinal inhausion is likely to be excited. Is hers not *par excellence* the very condition?

GRAVID NAUSEA AND INANITION.

Terms descriptive of the long recognized relation (of some kind) between the pregnant uterus and the almost invariable concomitant gastric disturbances are not very numerous, and some of them indefinite and awkward. I

have heretofore frequently used the term "gravid nausea," and here suggest it as the most convenient for this form of hystero-neurosis. For the term hystero-neurosis I am glad to render acknowledgment to a Fellow of this Society, Dr. George J. Engelmann, of Missouri.¹ It at once indicates the origin and the complex pathology of a large variety of reflex manifestations. The most frequent, the most inevitable, often the most distressing, and frequently for the time being, the most uncontrollable of these hystero-neuroses is the nausea and vomiting of pregnancy.

One of the oldest authors by whom anti-peristalsis as such is discussed in connection with pregnancy is Moreau. It will be recollected that the term "sympathy" is but expressive of the phenomena, of the then unknown function of reflex action, not enunciated by Marshall Hall until 1837.

In remarking upon "the sympathetic signs of pregnancy," he says: "All these gastric phenomena do not depend upon the same cause; the vomiting in the last period seems to be owing to a sympathetic action, or rather a sort of nervous irradiation which extends from the uterus to the adjacent organs, an action which we can understand and explain in the following manner: The uterus being a centre of attraction during pregnancy, and constantly changing in size during the first three months, is impeded in its development by the resistance of the bones of the pelvis, and incarcerated, as it were in the pelvic cavity. It reacts forcibly on all the abdominal viscera by means of the numerous ramifications of the great sympathetic, from the hypogastric plexus of which its nerves chiefly originate. This nervous irradiation, the consequence of the compression and exaltation of the sensibility of the uterine nerves, extends to the solar plexus, reaches the epigastric centre, causes anti-peristaltic contractions of the stomach, and consequently vomiting."²

The above is valuable, as stating in the most terse and

¹ *Tr. Am. Gynec. Soc.*, vol. ii., p. 483.

² *Practical Treatise on Midwifery*, by J. F. Moreau, p. 116.

pertinent manner one of the means by which the pregnant uterus is converted into a sensitive excitor to the reflex phenomena presented by the digestive organs ; namely, its compression and exalted sensibility. To this the gynecologist of the present day knows full well may be added the irritation of inflammatory states of the cervix, as abrasion (Sims), ulceration (Bennett), but more frequently than all, gravid malpositions, which greatly add to the compression and consequent exaltation of sensibility in the uterine nerves.

It is important to the object of our present discussion to call attention to the fact that in reflex disturbances of the alimentary canal, from whatever direction they may have originated, there is more frequently a reversal of the ordinary direction of its muscular action than any mere exaggeration of normal peristalsis : intense pain and syncope, when they affect the digestive organs, produce nausea ; the injured mamma, the inflamed ovary, the bruised testicle, the irritable uterus, all exemplify this ; nephritic colic is attended with nausea, but strangulated hernia and ileus with stercoraceous vomiting. The habitual and long-continued local irritation in the uterus, consequent upon gestation, and the nutritive processes of which it is the centre, establishes it, for the time being, as the common excitor and disturber of many organs, to the functional activity of which its relations ordinarily are by no means obvious. Among these, none appears more prominently affected than the stomach and intestinal canal. The effect of a large number of pregnancies — it will be admitted, the majority — is to establish an abiding and habitual irritability of the gastrointestinal canal, the stomach especially, but every portion of the tube is in ready response to irritation. That this response is, as a rule, by inverted rather than direct action, common observation will substantiate — the habit is retrostaltic ; borborygmi in the colon, eructations, regurgitations, nausea, and vomiting in the stomach, with a constipated habit, far more frequently characterize the gastric and intestinal action of pregnant women than diarrhea and other manifestations of downward action.

From the above consideration of the effect of gravid uterine irritation upon the gastro-intestinal canal, namely, its predominant predisposition and tendency to retrostalsis, the conclusion would seem inevitable that of all the conditions of gastric disability in which rectal alimentation could be demanded, that of the nausea and inanition of pregnancy is the most favorable.

Not only is the great practicability of rectal alimentation in the majority of severe cases highly probable, but injury in such cases is reasonably to be apprehended, as a result of buccal ingestion. That the long-continued influence of reflected irritation upon any organ, whether through reflex-motor or reflex-secretory action through the ganglionic system, is capable of dynamically altering its structural condition has for some time been known. It was long since shown¹ that the reflected dental irritation of the fifth nerve in infants is capable not only of modifying the secretions of the stomach and alimentary canal, but also of influencing their vascularity, giving rise to the gastritis and enteritis of the cholera infantum at the period of the first dentition, as also to the various cutaneous eruptions of that disastrous phase of infantile existence. In the remarks accompanying the report of a highly interesting case of gravid nausea, successfully treated for five weeks by rectal aliments, by Dr. A. Y. P. Garnett, of Washington, the opinion is expressed that "uterine irritation reflected for a protracted period upon the stomach often establishes a true gastritis, which may constitute one of the conditions imperatively demanding rest."² Though many deny that there is organic change in the mucous membrane of the stomach, it is highly probable that in some extreme cases this hyperemic condition is evoked. Such a condition could only be aggravated by the gastric ingestion of aliments.

¹ *Southern Med. and Surg. Journal*, June, 1850.

² The report of this valuable case came to hand too late for introduction in the present paper. The notes of a most painful case of gravid nausea — death without delivery in the eighth month of gestation — have recently been furnished to me by my distinguished friend, Prof. L. A. Dugan, of this city.

CONCLUSIONS.

The following principles may legitimately be deduced from the foregoing discussion : —

1st. That the exhaustion resulting from gravid nausea not infrequently demands a supply of food over and above that which can be retained by the stomach. Death has resulted from the inanition thus produced.

2d. That the number of well-authenticated cases on record — ranging from three months to five years — fully demonstrate the adequacy of rectal alimentation to sustain nutrition unassisted by other means of ingestion.

3d. That rectal nutrition requires rather an explanation of its *rationale* than a demonstration of its truth.

4th. That water and tenuous, nutritious, and medicinal solutions are probably absorbed directly into the blood, or by the portal radicles and mucous membrane of the rectum and colon, for digestion in the liver.

5th. That the digestion of composite aliments is never effected in the rectum or colon, on account of the absence of the “digestive fluids” universally recognized as indispensable to their disintegration and solution. Their undissolved condition and the absence of absorbent vessels in the rectum and colon prevents their entrance into the blood from these portions of the alimentary canal.

6th. That the admixture artificially (Leube) of digestive principles, pancreatic juice, etc., with the injected food is not necessary or important to the efficiency of rectal nutrition.

7th. That the “vicarious secretion” (Flint) of the elements of the gastric juice, pancreatic juice, and other digestive fluids by the glandular structures of the rectum for the preparation of the rectal aliments is highly improbable, and certainly not necessary to accomplish their ultimate digestion and absorption into the blood.

8th. That the secretion of these fluids from their proper surfaces and glands (Flint), as the stomach, pancreas, liver, etc., and their descent into the rectum may also be denied as one of the conditions to success in rectal nutrition.

9th. That the true explanation of the almost uniform efficiency of rectal alimentation and its physiology is to be found in the reversal of normal peristaltic action: first in the rectum, sending the injected aliment above the sigmoid flexure, and then past the colon and ilio-cecal valve into the small intestine. Here digestive fluids for their disintegration, solution, and chylification are abundant, and here also lacteals abound for chylous absorption. This retrostaltic action when continuous, as in rectal alimentation, accomplishes the ascent of the nutriment from the rectum into the small intestine. As here considered, I believe "Intestinal Inhausion" to be a newly recognized function of the alimentary canal. It is to the intestines what deglutition is to the stomach. Through its instrumentality, rectal and buccal ingestion are as nearly as possible equalized in both their *rationale* and their results.

10th. That the nutrition of the body by rectal aliments can be accounted for solely on the recognition of intestinal inhausion. Without it the digestion and absorption of such solids or semi-solids as boiled eggs (Flint), meat-broths, and pulps could not be explained.

11th. That the present view in regard to the movement of the contents of the alimentary canal is probably incomplete; and that aliments, whether from buccal or rectal ingestion, while undergoing digestion and absorption, are not subjected solely to a downward movement, but to alternations of progression (prostalsis) and retrogression (retrostalsis), passing and repassing the absorbent surfaces of the intestine repeatedly, till deprived of nutritive elements.

12th. That the rectal ingestion of food is a valuable substitute for gastric ingestion in all cases of disability of the upper portions of the alimentary canal.

13th. That in the early months of gestation reflected uterine irritation establishes a habit or abiding tendency to retrostaltic action in the muscular tunic of the entire alimentary canal, and that it is from this retrostaltic irritability that the nausea and vomiting of pregnancy originate.

14th. That, on account of this retrostaltic irritability, so manifest in early gestation, the intestinal inhausion of rectal ingesta is greatly facilitated ; and that this circumstance renders gravid nausea, above all others, the condition most favorable for efficient rectal alimentation.

15th. That under the careful and systematic application of rectal alimentation, artificial abortion for the relief of gravid nausea can be banished from practice, even as a last resort.

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